tory. The brief reference to such an important subject as the constitution of steel is to be regretted.

The subject of crystallography, which was formerly given in the volume of the non-metals, has been transferred to this volume and occupies fifty pages. It is fully believed that such special subjects as this and spectrum analysis (25 pages) might be condensed into much smaller space without injuring the value of the book.

The metallurgical and technical processes, as in previous editions, have been satisfactorily treated, and have been brought up to date.

While the chemists will be pleased to have so excellent a statement of his science as this book, he will regret that the author has not drawn more largely from his long experience and given more attention to criticism and generalization.

HENRY FAY

Lead and Zinc in the United States, Comprising an Economic History of the Mining and Smelting of the Metals, and the Conditions which have affected the Development of the Industries. By WALTER RENTON INGALLS. Pp. x + 368, illustrated. New York, Hill Publishing Co. 1908. $4.

Most publications dealing with the histories of metals have mainly an antiquarian interest. The two leading exceptions to this general rule are found in the great work of Beck on iron, and the more general book of Neumann on the leading industrial metals, as both authors have taken up the statistical, industrial and technical sides, and added them to the usual chronological treatment of the subject.

The present work deals with lead and zinc only, the ores of which frequently occur together and therefore influence each other in treatment. The new departure of this publication lies in the fact that, restricting the field to the United States, it considers the American methods of treatment of the metals from the mine through the smelter to the market of the finished product. The technical processes are given with sufficient details to be clear even to the reader not especially versed in this branch of engineering.

The time of writing such a work is opportune, as some of the founders of the modern American lead-smelting practise are still actively engaged in their profession, and as the fathers of the first industrial production of zinc are still living; nor could the work have fallen into better hands than those of the author, who is well-known to the mining and metallurgical profession as an engineer, as a writer on subjects relating to lead and zinc, and as the editor of one of our leading technical journals and annuals.

The introduction gives a brief and concise review of the history of the two metals in this country. The first part, which deals with lead, is much longer than the second, devoted to zinc. This was to have been expected, as while lead was first mined in the early part of the seventeenth century, zinc was not produced until two centuries later.

The history of lead begins with an account of the occurrence of lead ores. The discussion outlines the leading geological features of the deposits, but dwells more upon the character and grade of the ores, and upon the industrial conditions which governed the mining operations. This is followed by the chronology of the history of lead-mining, which starts from the first record of 1621, when lead was mined and smelted near Falling Creek, Va., and records the leading events down to 1906. Chapter III. gives a valuable résumé of the development of the blast-furnace practise of smelting silver-bearing lead ores, and of the treatment of silver-free lead ores in the ore-hearth and the reverberatory furnace. It shows how blast-furnace smelting developed from crude beginnings into its present unsurpassed excellence by the application of science to art, and by concentration of operations into large, centrally located plants. In the account of the ore-hearth work the increase in yield by the recovery of fumes receives due consideration. While in smelting the work of Arents, Eilers, Hahn, Raht and others is recorded, in the chapter on refining we should have liked to see mentioned the invention of the Steitz siphon,

which changed the refining practise as did the Arents siphon tap the blast-furnace work, and the systematization of the complications in the Parkes process, which is more largely due to E. F. Eurich than to anybody else, and which forms the basis of the modern American practise. We miss also any record of some early eastern refineries, as, *e. g.*, the Delaware Lead Works at Philadelphia, and other smaller plants around New York. Chapters V.–XII. give a detailed history of the mining and metallurgical operations of the several states and territories. The production of metal at different periods is usually given, although in some cases, *e. g.*, in Montana, the data are missing. The remaining 55 pages of the 255 given to lead deal with the statistics of production, consumption and prices, with the commercial conditions, the tariff on lead, the labor conditions and with trade agreements and combinations.

The second part, which takes up 90 pages, treats of the history of zinc according to the same general plan as followed with lead. The mechanical concentration of zinc ores, which plays such an important part in the treatment, receives a separate chapter. The chapter on the metallurgy of zinc, the author's specialty, contains a critical review of the different types of distilling furnaces which have been and are used in this country; it is a chapter which every metallurgist will study with profit and pleasure.

The book, as a whole, is most satisfactory, as it is replete with valuable information presented in an interesting way. Last, but not least, it has a full index which enables the student to look up points upon which he desires enlightenment.

H. O. Hofman

SCIENTIFIC JOURNALS AND ARTICLES

The American Naturalist for January begins with the first part of a paper by Robert F. Griggs, on "Juvenile Kelps and the Recapitulation Theory." J. Stafford describes "The Larva and Spat of the Canadian Oyster," giving special attention to the microscopic stages mostly omitted in the work of W. K. Brooks. Waldemar Jochelson presents some interesting notes on "Traditions of the Natives of Northeastern Siberia about the Mammoth" and there are other notes on "The Age of Trotting Horse Sires" and "The Influence of Environment upon Animals."

The American Museum Journal for January has articles on "The Duck Hawk, Hackensack Meadow, and Egret Groups," "Two Noteworthy Museums" (the Congo Museum, Brussels, and Senckenburg Museum, Frankfurt), "The International Tuberculosis Exhibition" and "An Ethnological Trip to Lake Athabasca," besides notes, lists of members elected since the last issue, and the lecture announcements.

The Bulletin of the Charleston Museum for December gives an account, with plan, of "The New Building" which contains the collections, library and lecture room. A note on "The History of the Museum" shows that so late as 1843 it was still under the auspices of the Literary and Philosophical Society of Charleston.

The Museum News of the Brooklyn Institute for January contains an article on "The Hoatzin," by Geo. K. Cherrie, which gives a very full account of this interesting bird and includes a considerable amount of new information gathered by Mr. Cherrie. A note on the leather-back turtle given by the New York Aquarium, states its weight to have been a little over 840 pounds; extreme length, following curve, 6 feet, 10 inches, from flipper to flipper over shoulders, 8 feet, 9 inches. The Children's Museum section gives "Some Evidences of Progress in 1908" in the matters of increased attendance by both children and teachers, and an increasing use of the collections and library.

BOTANICAL NOTES

PHYSIOLOGY AND ECOLOGY

Alfred Dachnowski's brief paper on "The Toxic Property of Bog Water and Bog Soil" (*Bot. Gaz.*, Aug., 1908) is an attempt to contribute something to the solution of the problem of bog conditions so far as vegetation is concerned. Studies were made of a bog island in Buckeye Lake in central Ohio which ap-